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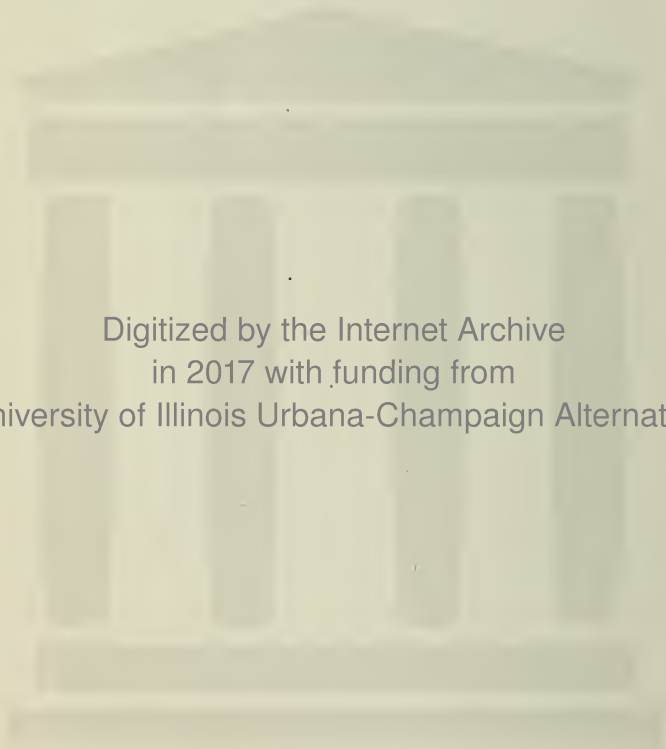
Department of
MEASUREMENT EFFICIENCY AND STANDARDIZATION

Information on
EDUCATIONAL STANDARDS

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DEPARTMENT OF MEASUREMENT EFFICIENCY AND STANDARDIZATION

ORGANIZATION

The organization of the department of measurement, efficiency and standardization within the school of education was approved by the state board of education July 15, 1913, and work was begun, September 1, 1913, under the supervision of the director of the School of Education, Dr. W. W. Phelan.

Believing that the work of standardization is one of the most vital movements in education the university secured Professor Stuart A. Courtis the originator of the Courtis Standard Tests in Education as consulting director. The department is prepared to assist superintendents, principals, and teachers of the state in the preparation and examination of papers testing their schools.

HISTORY

During the last few years the movement for efficiency, so general in the industrial world, has made itself felt in our school circles. In England Sir Francis Galton was first to begin the systematic study of mental and social measurements. In the United States Dr. J. M. Rice the editor of the Forum in 1902, used a rough comparative test in the measurement of 6000 children and found a great waste in the teaching efficiency of spelling and arithmetic.

In 1908 Dr. T. W. Stone of the Farmville State Normal School, Virginia, tested the arithmetic ability of 6000 sixth grade children in the four fundamental operations and reasoning, and found a great waste in the pupil's time and efficiency. Recently Ayres, Thorndike and Freeman have each given a handwriting scale by which to measure the efficiency in writing. Cornman, Suzzalo, Wallin and Pearson, have made important measurements in spelling, and Hillegas and Thorndike have presented a scale of measurement for English composition.

From 1907 to 1910 Stuart A. Courtis conducted a series of experimental tests to develop methods of handling the testing work and to ascertain the evaluation of units of efficiency. Since then he has collected over 100,000 records of children in Detroit, Boston, New York

and other cities from which he has drawn his eight standards of scientific measurement. The new Courtis measurements consist of three sets of tests, each designed for a different purpose. These are known as Series A, comprising the eight standard tests in arithmetic; Series B, a set of four tests in the four fundamental operations of arithmetic planned to secure more definite objective standards than was possible with series A; and Series C, a set of six tests in handwriting, punctuation, spelling and composition.

PURPOSE

The use of educational measurements in practical school work is comparatively recent. The technical phases of the work were not included in the professional training of most teachers and superintendents of more than five years experience.

The idea of scientific measurement has met with general acceptance. Superintendents everywhere are recognizing the necessity for the training of their teachers along these lines. They are realizing more and more the educational and stimulating effects of experimental work upon the entire teaching force.

It is the purpose of the department of measurement, efficiency and standardization to meet the growing demand of education to measure the work of the school children and to substitute for mere opinion exact knowledge derived from scientific measurements of methods and of products.

Therefore, the work of this department will be four-fold; first, a determination, in such subjects as arithmetic, handwriting, spelling and English composition and other branches of the elementary curriculum, of the existing conditions throughout the state, and of the improvement resulting to pupils after a year's work under scientific measurement; second, the collection and tabulation of these results for the general good of the superintendents and the teachers of the state; third, the planning and supervising of experimental work designed to improve the efficiency of existing methods; and fourth, the laboratory examination and study of the special difficulties of sub-normal and super-normal children.

COST

The cost of testing work need not be great. The Courtis tests are sold without profit to those who will share their results with others. Copies of the essential records are made upon special sheets and are sent to the Department of Measurement, Efficiency and Standardization at the University for tabulation with similar results from other schools. The products of these tabulations are shared with contributing members, but no names are disclosed without special permission.

On this co-operative basis the university will supply at cost the Courtis tests including all record sheets and complete instructions for use.

The complete material for a single test costs from one to three cents per child, depending upon the work attempted.

The time required for the Courtis tests, owing to time saving devices in counting and scoring papers, and tabulating results, is reduced to a minimum.

It is designed to issue bulletins from time to time giving the results of these investigations. As data accumulates and standards of achievement in the various school subjects are gained these results will be tabulated for the guidance of the schools throughout the state.

No one need hesitate to take part in this work because of any lack in preparation since definite printed directions are supplied for every step. An experimental investigation is often best handled by a committee of teachers appointed after a discussion of the specific problems. In this way a superintendent makes his meetings effective for teacher-training.

The School of Education in the regular and summer sessions of the university conducts special courses in educational measurements. Under certain conditions the department will be able to supply trained graduates to assist in giving the tests and thereby aid in the training of teachers.

Moreover the School of Education in special cases is prepared to allow credit for testing and experimental work done under its direction.

GENERAL PLAN

The first work of the Department will constitute in effect a state-wide survey of conditions in Arithmetic, Handwriting, Spelling, Punctuation, Grammar, and English Composition. One or more of the following investigations should be given as introductory tests, making absolutely no preparations for them. Further tests later in the year will then show the changes that have been produced by teaching effort. The immediate need however is to secure a measure of existing conditions.

INVESTIGATIONS

I. The Measurement of General Conditions in Arithmetic.

This investigation uses Series A of the Courtis Standard Tests. The time required is about four hours per class; the cost about three cents per child.

Series A, Arithmetic

The tests of this series are the original Courtis tests in Arithmetic

and have been fully standardized. The subject matter of each of the eight tests in this series is as follows:

- | | | |
|-------------|--|----------------------|
| Test No. 1. | Addition | } (Combinations 0—9) |
| 2. | Subtraction | |
| 3. | Multiplication | |
| 4. | Division | |
| 5. | Copying Figures (Rate of Motor Activity) | |
| 6. | Speed Reasoning (Judgments of operations to be used in simple one-step problems) | |
| 7. | Fundamentals (Abstract examples in the four operations) | |
| 8. | Reasoning (Two-step problems) | |

Series A is designed to measure the correlation between the simpler abilities of the first six tests, and the more complex abilities of Tests 7 and 8. They serve their purpose admirably. For those who believe in the teaching of the tables, they give a view of the completeness and balance of training afforded by any particular school as compared with the average achievements of schools in other places, and they furnish the teacher with accurate measures of the peculiarities and weaknesses of individuals which enable him to adjust his work accordingly. Three editions of this series, equal in value but differing in every figure, have been published, so that repeated tests may be made either during one year, or in successive years. When this is done, the results obtained in one grade may be passed along with the child for the guidance of teachers in the higher grades. The Courtis system supplies record and general and comparative graph sheets upon which the individual record and the curves for the different years may be permanently recorded.

Tests No. 1 and No. 2 each consist of 120 examples to be finished under a time limit of one minute. A portion of test No. 2, which presents the plan of both tests is given below.

Arithmetic—Test No. 2. Speed Test—Subtraction

Name _____ School _____ Grade _____

Write on this paper, in the space between the lines, the answers to as many of these examples as possible in the time allowed'

9	7	11	8	12	1	9	13	4	12
0	3	6	1	3	0	7	8	3	6
—	—	—	—	—	—	—	—	—	—
2	7	13	3	10	1	6	15	4	8
1	5	8	2	5	1	3	9	2	3
—	—	—	—	—	—	—	—	—	—

Tests No. 3 and No. 4 each consist of 120 examples under the

time limit of one minute. A portion of test No. 3 which presents the plan of both tests is given below.

Arithmetic—Test No. 3. Speed Test—Multiplication

Name_____School_____Grade_____

Write on this paper, in the space between the lines, the answers to as many of these multiplication examples as possible in the time allowed

3	4	9	0	5	4	2	7	4	9
2	7	8	2	6	1	9	6	0	5
—	—	—	—	—	—	—	—	—	—

1	2	8	1	5	1	2	7	0	8
9	5	7	1	3	6	8	7	6	3
—	—	—	—	—	—	—	—	—	—

Test No. 5 is a speed test in copying figures. It contains 240 printed figures which are to be copied under the time limit of one minute. A portion is given below.

Arithmetic—Test No. 5. Speed Test—Copying Figures

Name_____School_____Grade_____

Copy on this paper, in the space between the lines, as many of the printed figures as possible in the time allowed. Write as rapidly as possible, but form the figures as carefully as in working examples.

2	4	9	6	7	4	2	9	7	6	6	2	9	4	7
2	6	9	7	4	4	6	9	2	7	6	4	9	7	2

Tests No. 6. and No. 8 are reasoning tests in one and two step problems respectively. The first is a speed test of 16 examples under a time limit of one minute; the second contains eight problems and is to be finished under a time limit of six minutes. A portion of No. 8 is given below.

Arithmetic—Test No. 8. Reasoning

Name_____School_____Grade_____

In the blank space below, work as many of the following examples as possible in the time allowed. Work them in order as numbered,

entering each answer in the "answer" column before commencing a new example. Do not work on any other paper.

1. A farmer who had already sold 1897 barrels of apples from his orchard hired 59 boys to pick the apples left on his trees. Each boy picked 24 barrels of apples. What was the total number of barrels the farmer got from his orchard that year?

ANSWER

Test No. 7 involves the four fundamental operations of arithmetic and while part of the Series A experiment, has from its importance become the subject of a special school investigation. It is presented as investigation number II.

II. The Measurement of the Teaching of the Four Processes in Arithmetic

This investigation uses test No. 7, of Series A, of the Curtis Standard Tests. The time limit is twelve minutes, the cost about one cent per child. The test contains fourteen examples in the four fundamental operations. A portion of the test is given below.

Arithmetic—Test No. 7, Fundamentals

Name..... School..... Grade.....

In the blank space below, work as many of these examples as possible in the time allowed. Work them in order as numbered, writing each answer in the "answer" column before commencing a new example. Do not work on any other paper.

OPERATION	EXAMPLE	ANSWER
Subtraction	62132104—38396767=.....	
Multiplication	56804x564=.....	

III. The Determination of Standards in each of the Four Fundamental Processes.

This investigation uses Series B of the Curtis Standard Tests. The time is about three hours per class; the cost about two cents per child.

Series B, Arithmetic

The results from these tests will serve to indicate the needs of individual children, and so operate as to improve class work. This series consists of four test sheets, one each in each of the four fundamental processes.

The work done with Series A has proved that the basic problem

in education today is that of ministering adequately to individual needs. The first step toward this end is the formulation of definite objective standards. The standards derived from the use of Series A, are complex.

Accordingly, Series B represents an attempt to secure definite objective standards for each of the four operations with whole numbers, addition, subtraction, multiplication and division. On the basis of the knowledge gained from Series A, a test has been constructed for each operation to serve as a general measure of ability in that operation.

Test No. 1 in addition consists of 24 examples, each example three columns wide, each column nine figures long. The figures are so chosen that all the fundamental combinations are represented. The time allowance is eight minutes. The test as a whole and in its component parts is thus long enough to measure whether or not a child or class has learned (1) the fundamental combinations; (2) the mechanism of column addition; (3) to carry; (4) to bridge the attention spans; (5) to control the effects of fatigue; (6) to work at the proper speed; and (7) with proper accuracy. When this test is standardized, it will be possible to set for each grade just the degrees of skill in addition that is within the reach of the average child. A portion of test No. 1 is given below.

Arithmetic—Test No. 1. Addition

You will be given eight minutes to find the answers to as many of these addition examples as possible. Write the answers on this paper directly underneath the examples. You are not expected to be able to do them all. You will be marked for both speed and accuracy, but it is more important to have your answers right than to try a great many examples.

927	297	136	486	384
379	925	340	765	477
756	473	988	524	881
837	983	386	140	266
924	315	353	812	679
110	661	904	466	241
854	794	547	355	796
956	177	192	834	850
344	124	439	567	733

Test No. 2 in subtraction consists of 24 examples similar in complexity to test No. 1 but under a time allowance of four minutes.

Test No. 3 in multiplication consists of 25 examples under a time limit of six minutes. A portion of this test is given below.

Arithmetic—Test No. 3. Multiplication

You will be given six minutes to work as many of these multiplication examples as possible. You are not expected to be able to do them all. Do your work directly on this paper; use no other. You will be marked for both speed and accuracy, but it is more important to get correct answers than to try a large number of examples.

8246	7843	4837	3478
29	702	83	15
<hr/>	<hr/>	<hr/>	<hr/>

9357	9256	9735	5927
62	73	49	58
<hr/>	<hr/>	<hr/>	<hr/>

Test No. 4 in division consists of 24 examples similar in complexity to test No. 3 but under a time limit of eight minutes.

IV. The Determination of Standards in English Composition.

Handwriting, spelling, punctuation, etc. Time required, four or more hours; cost about 2 cents per child.

Series C, English

The tests in English have also been made necessary by the work done with Series A. The problem of teaching reasoning in Arithmetic, judging by the results so far secured, will probably prove in the last analysis to be mainly a problem of teaching children to read understandingly. As, however, it was impossible to measure ability to read without at the same time securing material for evaluating the ability to write, arrangements have been made for scoring the papers of these tests in respect to handwriting, punctuation, spelling, grammar and English composition. The series as a whole measures a few of the more important fundamental abilities involved in English work in the grammar grades, and as such is by far the most important testing work yet attempted.

The tests of the series are six in number, and the subjects are as follows:

- Test No. 1. Handwriting.
 2. Dictation.
 3. Original Story.
 4. Normal Reading.
 5. Careful Reading.
 6. Reproduction.

The standards to be derived from the giving of these tests are:

1. Standards of quality in penmanship for each grade.
2. Standard rates of reading and of comprehension.
3. Standard grades in English composition work of simple narration.
4. Standard bases of judgments of efficiency in teaching of handwriting, punctuation, spelling and syntax.

In addition, many correlations between abilities are possible that will throw a great deal of light upon the causes of differences in the teaching of English in different schools.

This series of English tests will be welcomed by many teachers who have followed the work of Thorndike and Ayers in Handwriting, and of Rice, Hillegas, and Bliss in English, but who have not had the professional training necessary to make constructive use of the standards evolved. Series C has been issued in an attempt to set definite problems, and to supply the materials, conditions, record sheets, etc., necessary to make co-operative solution of these problems possible. In handwriting, for example, no new scale will be issued, at least not at present, but provision has been made both in the instructions and in the record sheets for scoring the samples of handwriting secured by either the Thorndike scale, or the Ayers scale, or by both. In similar fashion in the rest of the English work, use will be made of the best products of the experiments already completed.

Ability in English is a complex made up of many component elements. It should be recognized that Series C represents a first attack upon a few of the simpler phases of the subject only. At the same time, these few are fundamental and the results promise to prove of the greatest value. The standardization of these tests will be the main work of the year.

The tests in Series C in dictation, punctuation, spelling, composition and the rate of normal reading and careful reading and the general powers of reproduction are based on a simple story with its accompanying picture. The test in handwriting which is part of the Series C tests has, because of its general importance, been made the subject of a special investigation. Accordingly it is explained as investigation V.

V. The Determination of Standards in Handwriting.

Time required, about two hours per class; cost, about 2 cents per child. A portion of the test sheet is printed below.

Copy as many letters as possible in the time allowed. Write at the highest speed at which you can make well formed, legible writing.

etaor hesin ldetc agoer

hysie tnlad eaurh wesik

faetn clreh dgsae timno

eruhl eatstd cieow ruhet

SELECTION OF TESTS

Care should be taken to choose the series of tests that best suits the purpose in mind. All the tests, however, are published for the solution of real problems, and call for serious work. Accordingly, for those who wish to do as little work as possible,—merely to give a single test to see the nature and results of the testing work,—Test 7, Series A, and a special series of folders, record sheets, etc., has been prepared to be given singly. Test 7 is a general measure of the ability to add, subtract, multiply and divide with whole numbers. By means of it, a teacher or superintendent can measure the general efficiency

of his work in Arithmetic in relation to the work done in other schools as well as gain a good idea of the Courtis system. The cost for all the supplies including instructions, record and graph sheets is about one cent per child. The work of scoring and tabulating the results from a class of fifty children will take about an hour and a half.

Series B is for those who wish to undertake constructive remedial work in the four operations only. The results from a test in September will show at once what children fall below standard in each operation. A second test in June will measure the degree of success or failure in overcoming the defects. In estimating the cost of the necessary material, allow two cents per child. The tests can be given in a single school period.

Series A and Series C make possible more elaborate experimental investigations in Arithmetic and English respectively. Series A will be of most value to those who wish to measure the balance of the course of study, the effects of special methods, and to work on kindred problems. The cost is about three cents per child. If the results are to be used for remedial work, graphs of the scores of individuals should be drawn on the comparative graph sheet. The total cost will then be about four cents per child. The tests are given in two school periods, one each day, and will require about four hours outside work per class.

Series C is peculiar in that the same material may be scored in many different ways. The money cost for the necessary material is about two cents per child, but the time cost will vary from one hour to eight or ten, depending upon the abilities scored. It is expected, however, that the more important results can be secured by an expenditure of four or five hours time. Series C also requires two school periods, one each day.

BENEFITS

The benefits to be received from the use of the tests, will of course be determined by the care and attention given to the work. Just as the value of a foot rule depends entirely upon the needs, skill and the ingenuity of the person using it, so the value of the Courtis tests is limited only by the limitations of the user. However, the increased attention paid to regular work by teachers because tests have been or are to be given, and the stimulating effects of new points of view, insure certain benefit from testing work. On the other hand, measurement in education has come to stay because by means of it those who know how can improve at once the efficiency of their work from ten to fifty percent.

CONCLUSION

This circular has been sent to you because your co-operation will materially increase the success of a work of importance to the entire

educational world. Radical readjustments are about to be made in educational methods and educational thought, and it is imperative that such re-adjustments be made, not upon mere guesswork or personal opinion, but upon a solid basis of measured fact. Definite information must be secured as to the product of school work under present conditions. Your co-operation in the standardization of Series B and C is most earnestly solicited.

The experiences of many teachers and superintendents prove that you personally will be repaid for the study, time, and money you may have to give to any testing work you attempt. The greater your professional ability, the more successful you will be in applying the results immediately to the improvement of your classes or schools. You will find, also, that one result of your own investigations will be a greater appreciation of the findings of the school inquiries which are being conducted in various parts of the country, and an added interest in the articles on scientific measurement that are appearing in the current magazines.

Address all correspondence to

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The University Bulletin has been established by the university. The reasons that have led to such a step are: first, to provide a means to set before the people of Oklahoma, from time to time, information about the work of the different departments of the university; and, second, to provide a way for the publishing of departmental reports, papers, theses, and such other matter as the university believes would be helpful to the cause of education in our state. The Bulletin will be sent post free to all who apply for it. The university desires especially to exchange with other schools and colleges for similar publications.

Communications should be addressed:

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